



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER OF PATENTS AND TRADEMARKS  
Washington, D.C. 20231  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/579,593	05/26/2000	Joseph J. Danko	81329A	8869

23685 7590 01/30/2003

KRIEGSMAN & KRIEGSMAN  
665 FRANKLIN STREET  
FRAMINGHAM, MA 01702

EXAMINER

STOCK JR, GORDON J

ART UNIT PAPER NUMBER

2877

DATE MAILED: 01/30/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/579,593

Applicant(s)

DANKO, JOSEPH J.

Examiner

Gordon J Stock

Art Unit

2877

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 04 November 2002.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 11-19 is/are rejected.
- 7) ☒ Claim(s) 1-10 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☒ The proposed drawing correction filed on 04 November 2002 is: a) ☒ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s) \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Drawings*

1. The proposed drawing correction and/or the proposed substitute sheets of drawings, filed on November 4, 2002 has been accepted. A proper drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The correction to the drawings will not be held in abeyance.

### *Terminal Disclaimer*

2. The terminal disclaimer filed on November 4, 2002 disclaiming the terminal portion of any patent granted on this application which would extend beyond the expiration date of any patent granted on Application 09/518977 has been reviewed and is accepted. The terminal disclaimer has been recorded.

### *Claim Objections*

3. **Claims 1-3, 11, 18, and 19** are objected to for the following: claims are required to consist of one period at the end of the claim. Therefore, all lettered limitations with a period following such as "a." should be corrected. The Examiner suggests a change to parenthetically enclosed lettering such as: "a." should read --(a)--. Appropriate corrections are required.

4. **Claims 4, 5, and 15** are objected to for the following: claims are required to consist of one period at the end of the claim. Therefore, all parenthetically enclosed letters with a period following such as "(a)." should only read --(a)--. Appropriate corrections are required.

5. **Claim 11** is objected to for the following: limitation, b., reads "to produce a first bream of light". This should read --to produce a first beam of light--. Appropriate correction is required.

Art Unit: 2877

6. **Claim 18** is objected to for the following: in the limitation, e., the phrase, "said imaging detector," lacks antecedent basis. Correction is required. In addition, in the limitation, e., it is unclear as to the meaning of the phrase, "on said imaging detector s said holder is moved." Correction is required.

***Claim Rejections - 35 USC § 103***

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. **Claims 11-17 and 19** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Nakata et al. (5,046,847)** as cited by the applicant in view of **Bishop (6,091,488)** as cited by the examiner in the prior office action.

As for **claim 11**, Nakata in a method for detecting foreign matter and device for realizing same discloses the following: two light sources adapted to produce a first beam of light and a second beam of light, the first beam disposed to illuminate a first stripe shaped region on the wafer at a first approach angle, said second beam being disposed to illuminate a second stripe shaped region at a second approach angle, said second stripe shaped region intersecting said first striped shaped region; a two dimensional solid state imaging element; an imaging lens disposed above the two stripe shaped regions for imaging onto the solid state imaging element using scattered light, the imaging lens having a Fourier plane, a filter disposed in the Fourier plane of

Art Unit: 2877

said imaging lens for masking off the diffraction pattern; means for moving said holder continuously, an x-y stage (Fig. 1, col. 4, lines 13-37; col. 8, lines 20-67; col. 9, lines 1-20).

Nakata is silent concerning a holder. The Examiner takes Official Notice that a wafer holder is well known in the art. It would be obvious to one skilled in the art at the time the invention was made to have the apparatus comprise a holder in order to keep the wafer from sliding off the scanning stage.

Nakata does not disclose one light source to produce a first and second beam of light. Bishop in an inspection apparatus for semiconductor devices discloses one light source for producing two inspection light beams (Fig. 10). It would be obvious to one skilled in the art at the time the invention was made to have Nakata's apparatus comprise one light source to produce two light beams rather than two light sources in order to save expenses due to having two light sources.

Nakata does not disclose a CCD camera in tdi mode. Bishop teaches a square array sensor TDI CCD camera in a system for inspecting semiconductor devices in order to have high scan speeds without blurring (col. 6, lines 1-8; col. 7, lines 1-10). It would be obvious to one skilled in the art at the time the invention was made to have the system comprise a CCD camera square array sensor in TDI mode in order to obtain blur free rapid scanning.

As for **claims 12 and 13**, Nakata in view of Bishop discloses everything as above (see **claim 11**). In addition, Nakata discloses the two stripe shaped regions intersect within the field of view of the system (col. 8, lines 20-67; Fig. 1). Nakata is silent concerning the regions intersecting in the center of the field of view, but there is scanning of the whole wafer (Fig. 28a). It would be obvious to one skilled in the art that the two intersecting striped regions will be

within the center of the field of view of the system, for scanning the wafer will eventually have the intersecting striped regions appear in the center of the field of view.

As for **claim 14**, Nakata in view of Bishop discloses everything as above (see **claim 11**).

In addition, Nakata in view of Bishop discloses a square array sensor (see **claim 11** above).

As for **claim 15**, Nakata in a method for detecting foreign matter discloses the following: intersecting a pair of intersecting stripe shaped regions on a wafer using first and second beams of light; said first beam of light striking at a first approach angle; second beam striking at a second approach angle; collecting at least some of the light scattered from the two regions illuminated but not specularly reflected as wafer is moving; forming an image of the area illuminated using a two dimensional solid state imaging element; masking off from the image formed the diffraction pattern produced by the lens from the background of the wafer (Fig. 1, col. 4, lines 13-37; col. 8, lines 20-67; col. 9, lines 1-20; Fig. 28a).

Nakata does not disclose utilizing a CCD camera in tdi mode. Bishop teaches a square array sensor TDI CCD camera in a system for inspecting semiconductor devices in order to have high scan speeds without blurring (col. 6, lines 1-8; col. 7, lines 1-10). It would be obvious to one skilled in the art at the time the invention was made to utilize a CCD camera square array sensor in TDI mode in order to obtain blur free rapid scanning.

As for **claims 16 and 17**, Nakata in view of Bishop discloses everything as above (see **claim 15**). In addition, Nakata discloses the two stripe shaped regions intersect within the field of view of the system (col. 8, lines 20-67; Fig. 1). Nakata is silent concerning the regions intersecting in the center of the field of view, but there is scanning of the whole wafer (Fig. 28a). It would be obvious to one skilled in the art that the two intersecting striped regions will be

Art Unit: 2877

within the center of the field of view of the system, for scanning the wafer will eventually have the intersecting striped regions appear in the center of the field of view.

As for **claim 19**, Nakata in a method for detecting foreign matter discloses the following: Illuminating a stripe shaped region on a wafer with a beam of light; detecting at least some of the light scattered from the area illuminated but not specularly reflected light using a two dimensional solid state imaging element and a lens (Fig. 1, col. 4, lines 13-37; col. 8, lines 20-67; col. 9, lines 1-20; Fig. 28a).

Nakata does not disclose utilizing a CCD camera in tdi mode. Bishop teaches a square array sensor TDI CCD camera in a system for inspecting semiconductor devices in order to have high scan speeds without blurring (col. 6, lines 1-8; col. 7, lines 1-10). It would be obvious to one skilled in the art at the time the invention was made to utilize a CCD camera square array sensor in TDI mode in order to obtain blur free rapid scanning.

9. **Claim 18** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Nakata et al.** (5,046,847) as cited by the applicant in view of **Nishi** (5,854,671) and further in view of **Bishop** (6,091,488) as cited by the examiner in the prior office action

As for **claim 18**, Nakata discloses the following in an apparatus for detecting foreign matter: a light source for illuminating a stripe shaped region; a two dimensional solid state imaging element; an imaging lens for imaging the area illuminated by the stripe shaped region on said imaging detector, said imaging lens having a Fourier plane, a filter disposed in the Fourier plane of said imaging lens for masking off the diffraction pattern produced by the background of the wafer from the beam of light (Fig. 1, col. 4, lines 13-37; col. 8, lines 20-67; col. 9, lines 1-20; Fig. 28a).

Nakata is silent concerning a holder. The Examiner takes Official Notice that a wafer holder is well known in the art. It would be obvious to one skilled in the art at the time the invention was made to have the apparatus comprise a holder in order to keep the wafer from sliding off the scanning stage.

Nakata discloses an x-y stage (col. 8, lines 22-24), but is silent concerning linear motors. Nishi in a scanning exposure apparatus for a wafer teaches using linear motors for moving the stage in an x and y direction (col. 18, lines 25-40). It would be obvious to one skilled in the art at the time the invention was made to have the x-y stage comprise a linear motor for the x-direction and a linear motor in the y-direction in order to have the x-y stage scan in two dimensions.

Nakata does not disclose a CCD camera in tdi mode. Bishop teaches a square array sensor TDI CCD camera in a system for inspecting semiconductor devices in order to have high scan speeds without blurring (col. 6, lines 1-8; col. 7, lines 1-10). It would be obvious to one skilled in the art at the time the invention was made to have the system comprise a CCD camera square array sensor in TDI mode in order to obtain blur free rapid scanning.

#### *Response to Arguments*

10. Applicant's arguments with respect to **claim 19** have been considered but are moot in view of the new ground(s) of rejection.

11. As for the allowable subject matter as set forth in the prior office action, the Examiner apologizes for the inconvenience caused by the grounds of rejection for **claims 11-18**, but after performing an updated search, the Examiner found grounds of rejection for **claims 11-18**.



*Allowable Subject Matter*

12. **Claims 1-5** would be allowable if rewritten or amended to overcome the objection(s) set forth in this Office action.

**Claims 6-10** are objected to as being dependent upon an objected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

As to **claim 1**, the prior art of record, taken alone or in combination, fails to disclose or render obvious the first approach and incident angles being adjustable independent of second approach and incident angles limitation in an apparatus for detecting the presence of contaminant particles on a semiconductor wafer, in combination with the rest of the limitations of **claim 1**.

As to **claim 2**, the prior art of record, taken alone or in combination, fails to disclose or render obvious the first approach and incident angles being adjustable independent of second approach and incident angles limitation and the angularly movable first and second tower limitations in an apparatus for detecting the presence of contaminant particles on a semiconductor wafer, in combination with the rest of the limitations of **claim 2**.

As to **claim 3**, the prior art of record, taken alone or in combination, fails to disclose or render obvious the first approach and incident angles being adjustable independent of second approach and incident angles limitation in a method for detecting the presence of contaminant particles on a semiconductor wafer, in combination with the rest of the limitations of **claim 3**.

As to **claim 4**, the prior art of record, taken alone or in combination, fails to disclose or render obvious the first approach and incident angles being adjustable independent of second

Art Unit: 2877

approach and incident angles limitation in an apparatus for detecting the presence of contaminant particles on a semiconductor wafer, in combination with the rest of the limitations of **claim 4**.

As to **claim 5**, the prior art of record, taken alone or in combination, fails to disclose or render obvious the first and second tower being angularly movable limitations in an apparatus for detecting the presence of contaminant particles on a semiconductor wafer, in combination with the rest of the limitations of **claims 5-10**.

### ***Fax/Telephone Numbers***

If the applicant wishes to send a fax dealing with either a proposed amendment or a discussion with a phone interview, then the fax should:

- 1) Contain either a statement "DRAFT" or "PROPOSED AMENDMENT" on the fax cover sheet; and
- 2) Should be unsigned by the attorney or agent.

This will ensure that it will not be entered into the case and will be forwarded to the examiner as quickly as possible.

*Papers related to the application may be submitted to Group 2800 by Fax transmission. Papers should be faxed to Group 2800 via the PTO Fax machine located in Crystal Plaza 4. The form of such papers must conform to the notice published in the Official Gazette, 1096 OG 30 (November 15, 1989). The CP4 Fax Machine number is: (703) 308-7722*

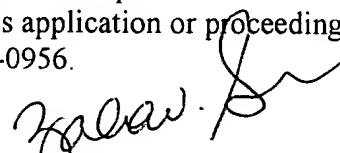
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gordon J. Stock whose telephone number is (703) 305-4787. The examiner can normally be reached on Monday-Friday, 10:00 a.m. - 6:30 p.m.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.



gs

January 17, 2003

  
Zandra V. Smith  
Primary Examiner  
Art Unit 2877